

University business incubators as a tool for accelerating entrepreneurship: theoretical perspective

University
business
incubators

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Abstract

Purpose – This paper aims to analyze the link between universities and business incubators (BIs) and to determine how students, scientific researchers and entrepreneurs can benefit from this linkage. It creates an environment in which everyone can help the other to put their new ideas, special skills and abilities into new businesses. In other words, the traditional universities' role has changed and entrepreneurial universities are now needed to redirect new knowledge for economic development through BIs.

Design/methodology/approach – This paper adopts an analytical descriptive methodology approach to describe the basic features of the data by using the descriptive research design. This research is based on examining a model provided by the author concerning boosting the entrepreneurial aspects and outcomes through university business incubators (UBIs) based on wide theoretical and empirical case studies. Also, the functional structural approach is used to investigate the relationship between two variables as UBIs are considered a new unit that has functions and structures to create an added value to universities and the society as a whole.

Findings – The educational system should create a favorable environment that enables young people to develop their mindset from employees to employers, and to prepare them to improve skills and knowledge to create jobs. UBI is the recent aspect of the BI evolution where the research outcomes are linked with the industry and development. This relationship between these entities will provide success to its stakeholders.

Social implications – Many incubators around the world are supported by universities. Others are making initiatives to link up with universities and higher education institutions to get the revenues and returns from its academic nature. Lately, university incubators became a type of incubator evolution and more supportive for entrepreneurs than other types of incubators.

Originality/value – The contribution of this study is to explain how UBIs succeeded to tie the results of scientific research with economy and development through entrepreneurial activities to accelerate and realize entrepreneurship strategies.

Keywords Entrepreneurship, Entrepreneurs, Business incubators, University business incubators, Incubators, University–industry linkages, UBIs

Paper type Research paper

Introduction

The relationship between universities and business incubators (BIs) is necessary as universities are the source of knowledge, research, resources and today's innovation-driven



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centers. The affiliation or management of a BI program inside a university represents a great advantage for the entrepreneurs, as these institutions can provide links to the industry, society and government entities.

Over the past two decades, universities have been urged to become more accountable to the wider public and to contribute directly to the local, regional and national economic development through taking on a range of “third mission” activities. Such activities include the incubation of start-up firms, knowledge commercialization, the development of knowledge transfer partnerships and providing entrepreneurship courses.

In the context of entrepreneurship, universities move one step ahead by structuring the mechanisms to enhance entrepreneurial culture and create new businesses. Today’s universities’ missions have witnessed a paradigm shift from teaching to a pre-focused approach on economic growth in terms of research, innovation and entrepreneurship. Scientific research has directed countries with emerging economies that suffer from a lot of economic problems such as unemployment and low economic growth rates into becoming knowledge-based economies by providing creativity, innovation, knowledge access, information exchange and suitable infrastructure. As a result, most of them resort to BIs to accelerate the economic growth wheel. Incubators act as an accelerator of commercialization of the research outcomes of the universities. The value of linking universities with researchers within can achieve the maximum efficiency of the BIs in the development of companies.

Universities could also enhance their role through an effective and well-integrated incubation system for promoting, creating and enhancing entrepreneurial society through the universities’ new missions. University business incubators (UBIs) provide a better context for generating revenues and supporting a financially, legally and technically win-win interrelation between universities, business sponsors, government and society.

This study adds a new trend of knowledge accumulation to this relationship, which is the role of UBIs in supporting different aspects of entrepreneurship from a theoretical perspective based on the empirical case study results.

Research problem

Universities have to face the changing and increasing demands with consideration of what they are expected to achieve. Teaching and research issues are no longer enough. Today is the so-called “third mission” where university–industry cooperation inventions and innovations are systematically channeled from universities into the industrial applications to develop an entrepreneurial economy. This method has been proven effective in many developed and developing countries.

This paper examines how the governments help university incubators to enhance R&D ability and to develop production efficiency and product quality. It also explores how universities can be a strategic partner to BIs in supporting entrepreneurs to fill the gap by using research results for economic development as university-based BIs can play a key role in serving as the place where academic and entrepreneurial strengths merge.

Therefore, the main research question which the study proposes is: “How can universities with BIs achieve entrepreneurship and support its strategies theoretically and in the light of best practices implication results?”

Research objectives

The aim of this research is to create an entrepreneurial ecosystem that is important for sustainable growth and develop recommendations for improving the performance of the UBI in the entrepreneurial context. To achieve this main aim there are some objectives:

- to outline the changing role of universities and affected factors;
- to analyze the UBIs role, conception and importance;
- to identify the university's new mission relationship with the BIs and entrepreneurship;
- to examine and investigate the validity of the model provided by the author concerning the relationship between UBIs and entrepreneurship;
- to explain opportunities and challenges faced by UBIs in supporting entrepreneurship; and
- to provide the learned lessons concerning how to use UBIs as a tool to reinforce entrepreneurship.

Research questions

This research developed the following questions to identify the link between UBIs and entrepreneurial practices as reviewed in various empirical studies:

RQ1. What are the new role determinants of universities and their characteristics?

RQ2. What is the relationship context between universities, entrepreneurship and BIs in different practices?

RQ3. What is the importance of UBIs for university, entrepreneurs and society?

RQ4. What are the recommendations for filling gaps concerning the correlation between UBIs for university, entrepreneurs and society?

RQ5. How do UBIs help reinforcing different entrepreneurship strategies and elements?

RQ6. What are the opportunities and challenges that face UBIs' role in supporting the entrepreneurship strategies?

Research methodology

The adopted research methodology in this study will be a qualitative one. An extended literature review is made to understand the main research objective that is derived from the analysis of the correlation between the UBIs for university, entrepreneurs and society the author will proceed with a deeper theoretical review to fulfill the objectives proposed above and to answer the questions mentioned above.

The author also used the functional structural approach to investigate the relationship between the study's two variables as UBIs is considered a new unit that has functions and a structure to create value added to universities and the society as a whole.

References are derived from several scientific articles, periodicals, reports, statistics and online resources.

Material studied

Reinforcing entrepreneurship through UBIs in this study is reviewed through three sections as follows: Section I introduces a comprehensive conceptual framework. Section II highlights the link between BIs, universities and entrepreneurship. Section III discusses the role of UBIs in supporting entrepreneurship. Section IV explains the challenges and

opportunities that confront this role, and final, the conclusion section with results, recommendations and a future agenda is presented.

In this study, the author provides a model for the relationship between UBIs and entrepreneurship and tries during the study sections to prove the validity of this model as follows (Figure 1).

conceptual framework and historical background

In this section, the definitions and history of the study concepts will be discussed as follows:

Business incubator

BIs started in the 1950s and has evolved gradually along with the technological and social changes. Most of them, as stated by Robles (2017), are managed as non-profit organizations and as a part of the public efforts to increase the economic development through ventures and job creations.

According to Sanyal and Hisam (2018), BIs firstly began in the US in the 1960s, and later developed in the UK and Europe through various related forms such as innovation centers, techno poles and science parks. They were recognized as a way of providing a variety of economic and socio-economic policy needs which can include wealth creations, supporting high potential small businesses growths, transferring technology, promoting innovation, enhancing links between universities, research institutions and business communities.

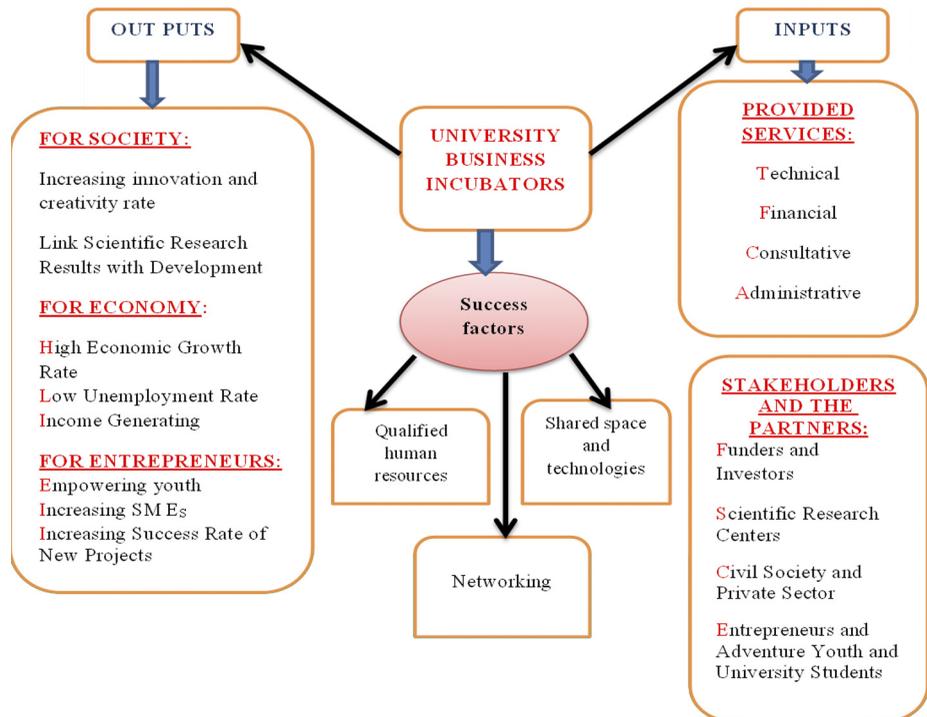


Figure 1.
Relationship between
BIs and
entrepreneurship

Source: Prepared by the author

Robles (2017) provided the evolution of the concept of BIs. Originally in 1985, BIs were defined as facilities that assist the early-stage growth of new start-ups through different services. Three years later in 1988, a new definition was added stating that the purpose of BIs is to link technology, capital and knowledge to talent to accelerate the growth of new companies, and to speed technology transferring.

An earlier definition by Mian (1996) defined IBs as “a strategy understood in relation to innovation centers and as a function of business and research development” whereas Greene and Butler (1996) viewed BIs as a mechanism to promote the technology-based firms’ development and to give the right resources to grow business to a level of maturity.

The National Business Incubators Association (NBIA, 2014) discussed that BI is a dynamic process of business enterprise development and a business support process that accelerates the successful development of start-up companies by providing entrepreneurs with specific resources these resources are usually developed by the BI management and offered through its network of contacts.

Al-Mubarak and Busler (2013) conducted a qualitative study that included ten multi-case studies in different countries. Its findings indicated that countries with incubators can play a vital role in economic development according to their growth, the number of clients served and the number of graduated firms.

From the author’s perspective, an incubator can, therefore, be identified as a physical location that provides a specific set of services to individuals, entrepreneurs or small companies. They are entities that help in sustaining innovation rates of start-up enterprises and enhancing the entrepreneurial activities.

Entrepreneurship

Entrepreneurship is defined by Ahmad and Seymour (2008) as a dynamic process of identifying economic opportunities and acting upon them by producing and selling products, but the OECD (2011) defined it as the phenomena associated with an entrepreneurial activity, where the entrepreneurial activity is defined as the enterprising human action in value generation through the creation of economic activity by identifying new products or markets that highlight the importance of the value added by entrepreneurial activities and the changes in the resources needed by the entrepreneurs.

Further, OECD (2001) defined the term “self-employment” as “an entrepreneur who works not for someone else but for him.” In another publication, in the same year, entrepreneurship was referred to as the enterprising individuals who display the ability to take risks with innovative ideas to generate new products.

Hattab (2013) explained that the global entrepreneurship monitor (GEM), for example, adopts entrepreneurship as “any attempt at new business creation, such as self-employment, a new business organization or the expansion of an existing business by an individual, a group of individuals or an established business that implies considering those who have just entered a market as entrepreneurs, as well as those who have been in the market for several years, but are still growing.

But Kuratko (2004) showed that the performance of entrepreneurs is based on starting a new business and using a window of opportunity to develop a business idea into a workable format, but entrepreneurship itself is more than just starting a business. Others such as Groenewald *et al.* (2006) and Lose (2016) see entrepreneurs as risk-takers in terms of offering products, identifying and developing new business ideas. They defined an entrepreneur as a person with the ability to identify business opportunities and utilize these opportunities for success as well as having the ability to manage these business opportunities to generate revenue.

Ravesteijn and Sjoer (2010) state that innovating, recognizing opportunities and contributing to the economic growth are common factors to all entrepreneurial activities. Therefore, one can say BIs should promote entrepreneurial activities and skills exercising to enable incubated small and medium sized enterprises (SMEs) to be developed and more sustainable.

To perform effectively, according to Michelacci (2003), an entrepreneurial background and skills are required for BIs. The level of the BIs' entrepreneurial ability and skills affect the degree of the success of the new BI process. Hence, entrepreneurship involves coming up with new pathways of managing resources while pursuing opportunities.

To sum up, BIs are relevant to solving economic problems, generating income and creating job opportunities. In addition, entrepreneurship has the ability to generate significant benefits of growth, employment, development and innovation. Hence, the gate for UBIs is education and universities that will be discussed in the following section.

University business incubators

A UBI is one type of BIs. Various typologies have been provided in this concern. Those categories are public incubators, private incubators and university incubators. The present research focuses on a general definition adopted by Barbero *et al.* (2012) and Grimaldi and Grandi (2005). According to them, a UBI is defined as a university-based institution that provides support for young business start-ups through tangible and intangible services.

Xu (2009) offered a similar definition to Barbero and Grimaldi and Grandi for university incubators stating that a university with an incubation system that provides a physical space within the university to promote the development of university spinoffs.

About one-third of BIs, as stated by Robles (2017), are housed by universities and college campuses. Such BIs are an efficient way of searching for cooperation and creating networks that generate an added value. Roura (2015) explained that the BI–university partnerships are beneficial for entrepreneurs, students, universities and incubators itself.

Entrepreneurs can benefit from the well-prepared laboratories with computer systems provided by the universities in addition to the well-trained human resources and experts in specific fields. Students, on the other hand, have the opportunity to implement their acquired information to real business cases, supporting entrepreneurship among them. Reinforcing links between university and business communities through transferring technological advances and research outcomes to the market through commercialization channels is a great benefit for university.

Hence, to understand well the link between universities, BIs and entrepreneurship, the following section will discuss this issue through explaining the partnership between BIs and entrepreneurship; entrepreneurship and universities; and BIs and universities.

Partnership between business incubators, entrepreneurship and university

Universities, entrepreneurship and BIs have reciprocal relationships where new concepts are being developed as a result of these relationships. These relationships will be discussed in detail in this section in terms of the relationship between BIs and entrepreneurship; universities and entrepreneurship; and the link between BIs and universities.

Relationship between business incubators and entrepreneurship

In their study, Al-Mubarak and Busler (2012) determined the roadmap for incubators with four important factors arranged as follows entrepreneurial climate, which showed 62%, was the primary purpose of the incubator; commercialization technologies, the second factor, by

55.5%; employment, the third factor, with 51.6%; and the final factor innovation with 46.1%. So, these results prove that entrepreneurship is one of the strategic outcomes of BIs.

In addition, incubators are a resource for new entrepreneurs to solve their problems as outlined by [Shahzad et al. \(2012\)](#), they also analyzed that incubators are vital for achieving the entrepreneurial spirit growth as they provide assistance to new entrepreneurs in many different aspects as found by [Al-Mubarak and Busler \(2010\)](#). These provided services and functions of incubators are including a shared space with technical equipment, managerial support, networking, access to knowledge and financial capital that encourage entrepreneurs through initial funding support.

Although services and office space are vital elements to incubator success, but an incubator focuses on the innovative entrepreneurs in providing its services. Entrepreneurs who are a part of an incubator are called tenants or clients. Anyone who wishes to enter a BI program has to apply for admission. [Tamásy \(2007\)](#) referred that each program has a group of requirements that applicants must fulfill to take part in the incubator.

Through networking and providing services, small businesses can afford the high transaction costs of doing business alone. Because most of the time there is a great need to generate innovation, a network can lead to the creation of what is called a technological network with technology transfer services to achieve the development of the firms integrated into the network. [Link and Scott \(2006\)](#) referred to a network of the technology-based organizations when talking about a university research park where universities can generate innovative and technology-related incubators. Networking can be done with other enterprises or professional associations related; this will help to move to the second relationship between universities and entrepreneurship.

Link between universities and entrepreneurship (entrepreneurial universities)

The link between universities and entrepreneurship results in a relationship known as entrepreneurial universities. Entrepreneurial education in universities has come a long way since the first entrepreneurship course was held by Professor Mace at Harvard. [Hofer and Potter \(2011\)](#) confirmed in their study the purpose of university entrepreneurial education. They divided this purpose into two types: the first, contributing to the creation of entrepreneurial attitudes and the second, inducing new firms is as vital as developing the skills needed to successfully grow a business.

A study by [Hofer and Potter \(2011\)](#) deduced by comparing attitudes of tertiary education students to entrepreneurship, in 19 different countries across the globe, showed that 43% of the students intend to be independently employment five years after graduating. This clearly reflected the strong link between universities and entrepreneurship. Turning university graduates into entrepreneurs can be a successful strategy to foster innovation and economic growth, especially in places undergoing economic changes, such as eastern Germany.

[Maritz et al. \(2015\)](#) investigated the growing role of universities in supporting entrepreneurship. Their study included the Australian universities that offered 584 subjects related to entrepreneurship. This included a dominance at the undergraduate level, representing 24 minors and/or majors and specializations in entrepreneurship. In total, 135 entrepreneurship ecosystems were identified.

In promoting entrepreneurship, [Hofer and Potter \(2010\)](#) stated that universities need to be more entrepreneurial and innovative. This can be achieved through monitoring the impact of entrepreneurial support on the graduates' entrepreneurial behavior and business activities of the university community members that will help advocate the motivation and incentives system.

At present, universities' budgets largely depend on the number of students, the degree of scientific excellence and other types that are not all directly concerned with entrepreneurship. Incentives for those involved in entrepreneurship support have, however, been of crucial importance for a university to succeed in its entrepreneurial functions. Empirical evidence from the USA shows that shifting the royalty distribution formula in favor of faculty members such as allowing faculty members to retain 75% of the revenue instead of only 33% would lead to greater efficiency in technological transfer and entrepreneurship. Time can be an important element for professors, which should be taken into consideration when designing incentives. The most important recommendation is to modify improvement and ownership guidelines by giving more concern to entrepreneurship in such decisions. It touches the essence of the academic researcher.

As agreed by [Lawton Smith \(2007\)](#), [Hannon and Chaplin \(2003\)](#) and [Feldman and Desrochers \(2003\)](#), it was not until the 1980s that any entrepreneurial role for universities became a wide part of public policy and practice, but governments with early developments in a range of countries such as the USA, the UK, Australia, Sweden, Germany, Italy and Japan, have all provided policy measures to encourage such activities that many universities now engage in, and which constitute a "third mission."

[Etzkowitz and Zhou \(2008\)](#) agreed that the concept of the entrepreneurial university emerged out of the change from a more conservative academic context to generating knowledge that integrated economic development and social progress with academic mission programs. However, [Moreno \(2019\)](#) argued that entrepreneurial universities are connected to a combination of different concepts such as innovation, pro-activeness and an organization's risk behaviors. One of the best ways to generate entrepreneurial activities at universities is the knowledge transfer and technology between industry and university, where companies are the recipients of knowledge. This information exchange depends on certain cultural determinants of academic entrepreneurship.

[Volles et al. \(2017\)](#) defined entrepreneurial education as a set of formal teaching activities that educate, inform and train individuals interested in business start-ups or the development of small enterprises. At a broader level, entrepreneurial education can be seen as education in entrepreneurial behavior without the need to refer to a person creating a new business but rather as a reference to any individual with an innovative behavior whatever activity they might practice.

In this sense, universities must pursue their mission to train individuals and firms should recognize universities' direct or indirect contribution to their revenues. Students already involved in firm activity may take part in start-ups than individuals with a pure academic experience, as the latter does not have the same opportunities.

As mentioned by [Moreno et al. \(2019\)](#), the data from the GEM in Spain in 2017, state that the risk average was traditionally three times higher than in the USA where the fear of failure was higher. The Spanish did not consider themselves as creative; and the media did not pay sufficient attention to the entrepreneurial activities. These characteristics have improved recently. According to the latest [GEM \(2019\)](#), risk aversion in Spain is now 10% higher than in the USA. In this sense, entrepreneurship is considered as a significant generator of growth benefits in employment and innovation.

Link between business incubators and universities

Universities have taken on new missions and relationships to contribute to economic growth and social development ([Schmitz et al., 2017](#)). Activities related to innovation and entrepreneurial activities in the academic agenda are shared with the concept of entrepreneurial universities.

Roura (2015) added that the need for generating knowledge in society as an essential element for competitiveness and sustainable development is a fact in all developed countries. That is why public administrations are giving more attention to knowledge strategies by gathering research, innovation and education that is known in the European Union as the knowledge triangle or the triple helix model based on the relations of academy, industry and government.

Thus, most business proactive universities are participating in BI programs or have some incubation partnerships as a teaching means for students and as a tool of commercialization of their inside-generated knowledge (Roura, 2015).

The university context, as determined by Barba-Sánchez and Atienza-Sahuquillo (2018), cannot neglect its role to reinforce students' entrepreneurship and to determinate the profile of the most entrepreneurially-oriented students to be ready to guide them once they finish their studies, for they may find self-employed work as a means to earn a living. Entrepreneurial education at the university level may be the way to succeed in the process of new business creation.

Vryonides and Lamprianou (2013) explained the modified role of universities. One aspect of this change is the socially-oriented perspective represented in education. Education is a public service and all individuals have the social right to receive an education. Another modification was the promotion of research culture as the new trend for enhancing the R&D represented in the industrial and economic growth.

To transfer knowledge to industries, universities have launched several initiatives including establishing university incubators. Audretsch (2014) agreed that recent universities have also moved away from basic research as a public service towards organization-based profit such as industries and businesses. The last ones are now the main target of universities to help them in solving their problems by providing accurate solutions.

Over 70% of the R&D resources in Taiwan are held by universities, which have become centers for new knowledge and technology. Through university–industry collaboration, innovative ideas and inventions are launched from universities into industrial implementation and are used to develop an entrepreneurial spirit. This method has been proven efficient in many developing countries (Wang and Wang, 2013). They added that with 163 colleges and universities, Taiwan has one of the highest intensities of higher education institutes all over the world in 2011. There are currently 98 college-level institutes with innovation incubators in Taiwan. There are also 11 corporately funded innovation incubators in the field. Many academic, research manpower and R&D achievements cope with the entrepreneurial spirit of Taiwan's people. Encouraging individuality and innovation not only helps to support the economy but also guide industries into top ranks.

The main goal of a BI is to foster the growth of new businesses locally by assisting entrepreneurs to start a new business in the area. Sanyal and Hisam (2018) mentioned that these benefits could be found in terms of increased jobs, the additional revenue and prosperity that flow as a result of these new businesses. These communities taken together can help a nation to develop and strengthen its industrial base. In turn, leading to increased growth and development which ultimately benefits all citizens.

A study by Meru and Struwig (2015) revealed the role of the BIs in the developmental process. It established the entrepreneurs' understanding of the importance of BIs in Kenya. The study concluded that there is a link between economic growth and BIs despite the fact that there was a gap between the actual services provided and the expectations of the clients.

Another study by Lalkaka (2002) conducted in the developing world revealed that 77 Chinese incubators, sponsored by the Torch program in 1999, provided financial returns,

with the investment for the year of 1998 likely to be covered by tax receipts alone in the following five years.

Seoane *et al.* (2014) studied the influence of training and gender in entrepreneurship through BIs in Galicia, Spain, and concluded that there is a leverage relationship between incubators and incubates. Studies in Brazil revealed that incubators have been relatively successful because of benchmarking for excellence with a focus on specific industries, strong monitoring and the tenants' progress evaluation towards financial viability and sustainability. The infrastructure is further linked to access to finance, export orientation and employment creation.

As seen by Wagner (2006) the role of BIs in economic development confirmed the positive impact of BIs in job creation. Matotola (2017) analyzed nine BIs with a total of 175 incubated businesses in the state of Missouri in the USA revealed evidence that these businesses had created 502 jobs in total or an average of 60.5 jobs each.

The European report of research and innovation program's (2018) goal of incubators stated that work should be at the outlines of the triple helix, where universities, industry and public sector reinforce each other by taking innovation and entrepreneurship in its account. Similarly, SMEs and multinationals often turn to the university to find solutions for their R&D needs, instead of performing the whole process themselves.

Mahmood *et al.* (2015) in their research about BIs and their impact on economic growth in Pakistan outlined that BIs had a vital role in generating, establishing and activating SMEs by encouraging jobs and generating revenues in a local community. According to them (2015), incubators generate jobs, income and create links with companies at the local economy level on the long term.

Hence, it is important to provide faculty and students with an entrepreneurial mindset to understand new businesses in the right place. To realize this goal, it should connect talent needs and industry demands of specific industrial fields with the university researchers' experiences. There is a correlation between industry, development and academic research that has the ability to generate knowledge and create new businesses through supporting entrepreneurship activities. Universities in this sense are called entrepreneurial universities. This moves us to the fourth relationship between the BIs and entrepreneurial universities.

Relationship between business incubators and entrepreneurial universities

The integration between entrepreneurship and education has been the subject of researches over the past decades. Kadir *et al.* (2012) and Turker and Senem (2009) agreed that with regard to higher education, a number of studies categorized universities according to the activities they perform in relation to training in entrepreneurship, using the term entrepreneurial universities.

Fernández *et al.* (2018) explained that the concept of entrepreneurial university comes out of the change from a more traditional academic context to generating knowledge that integrates economic development with research and teaching, other studies have analyzed teachers' perceptions of their own entrepreneurship education skills. Ruskovaara and Timo (2013) argued that entrepreneurial universities are a combination of different strategies such as innovation, pro-activeness and an organization's risk behaviors. Sherwood and Covin (2008) demonstrated that to create entrepreneurial activities at universities, knowledge and technology transfer between industry and university is the best way for this.

Success in an entrepreneurial project at a university may often be as a result of attitudes and directions coming from a package of different competencies such as creativity, autonomy or personal control, leadership or risk management. This is highlighted by Moreno *et al.* (2019) where the positive impact of entrepreneurial education on the evolution

of the main skills such as problem-solving and the determination of opportunities, motivation and students' willingness to involve in entrepreneurship.

Hong and Yang (2014) explored different variables that influence the students' intention at universities to start a business. They confirmed the important relationship between the intention to start a business and individual skills linked with safety, autonomy and technology-oriented, on one hand, and entrepreneurial education, on the other hand.

As indicated by Hofer and Potter (2009), university graduates have enormous creativity and economic growths. So, it is very important to mobilize them for entrepreneurial careers, enhancing their entrepreneurial competencies and supporting business start-ups, and often new tasks for higher education institutions that are being fully recognized.

Recently, OECD countries' public policy exchange has a vital role in stimulating innovative and good practice approaches by universities and supporting the lessons learned. The OECD LEED Committee (2018) surveyed 16 universities in ten members and three non-member countries on their goals, resources and practices in entrepreneurial support. The sample included all universities providing entrepreneurial support that applied for the international capacity building seminar.

Hence, entrepreneurial universities should have its own strategies concerning training, supporting different skills to students to encourage them to start their own businesses. It is also important to know whether the student has the required skills to start his own business or just has the intention of starting one.

The next section will tackle the establishment of new companies as a basic objective of supporting entrepreneurship at universities through creating innovative entrepreneurial mindsets.

3. Role of university business incubators in supporting entrepreneurship

Entrepreneurship has many different aspects such as commercialization, innovation and competitiveness. This section will discuss the role of UBIs in supporting these different aspects of entrepreneurship.

As previously mentioned, in different studies, economic growth in society needs innovation, commercialization and entrepreneurship. Al-Mubarak and Busler (2010) state that one of the most contributing channels to reach this target are incubators as they are a promotional tool for economic development and job creation. Incubators can realize the entrepreneur's performance and commercialization in both developed and developing countries.

According to the National Centre for Entrepreneurship in Education (NCEE, 2013) report, entrepreneurship is recognized by many researchers to be associated with innovations and the commercialization of university human capital and is therefore related to innovation in the environment of technology transfer offices, incubators and science parks. This view is supported by the public sector and even the international (OECD) perspectives recognized that universities are sources of technological innovation and "engines of growth" as cited by Gibb (2013).

The innovation concept in the university context as indicated by Gibb (2013) widen beyond technology. Generally, innovation is defined as creating and getting opportunities for new methods of doing things resulting in better goods and services, systems and ways of managing people and organizations. Innovation in an entrepreneurial university context may therefore be viewed in terms of: new firms and leadership initiatives promotion; knowledge organization and program evolution; internal and external parties' engagement; and new research explorations, methods and applications to practice. The successful continuity of innovation is a mission of individual enterprising endeavor and entrepreneurial capacity in an organization. Both necessary pre-conditions, sufficient only

when merged with an organization culture and wider context that is supportive to such activities.

Chandra *et al.* (2012) discussed that university incubators have a strong historical background in providing physical space, human capital, funding sources, reinforcing innovation and commercialization. Phillips (2002) and Audretsch (2014) pointed that universities did not only depend on educating students, evolving research, or even transferring knowledge, research contracts, licenses and spinoffs rather build the tools to enhance innovation, entrepreneurial thinking, developing organizations and entrepreneurial leaders, and upgrading people living standard. University incubators achieve an entrepreneurial society through a true spirit and a strong leadership commitment.

Salem (2014) agreed that UBIs are the most effective kind of incubators among all other types and student entrepreneurs benefit from university incubators to create links with business and to create their own businesses by joining those incubators. Somsuk *et al.* (2012) added four basic categories needed by university incubators to support entrepreneurs that are human, financial, organizational and technological resources.

Similarly, Robertson and Kitagawa (2011) argued that university incubators aim to develop commercialization by setting up spin-offs to intensify research promotion, innovative ideas, commercialization activities and developing entrepreneurs. Hofer and Potter (2010) confirmed that OECD encouraged the incubator owners to engage with universities to enhance the commercialization for the greatest benefit of society.

Todorovic and Suntornpithug (2008) and Al-Mubarak *et al.* (2013) agreed that recently, university incubators become supporter of entrepreneurs than other types. However, the role of university incubators is not limited to providing services to start-ups; rather they support leadership and reinforcing entrepreneurial culture.

Hence, the author explained that the link between innovation and commercialization as two aspects of entrepreneurship is imperative necessity. As providing new innovative methods and entrepreneurial ideas to entrepreneurs and students should be commercialized through UBIs on one hand, the research and technology results should be commercialized to benefit entrepreneurs and to bring new methods and explorations into practice, on the other hand.

Competitiveness is another aspect of UBIs, Mavi *et al.* (2019) analyzed that transforming to a knowledge-based economy required UBIs to increase the production of new established firms and support their competitive advantages through critical change to efficient financial regulations as applied in Iran.

Hence, the initiative to be far from a non-profit based organization towards a profit generating tool has increased the competitiveness among universities. The competitive environment, revenue maximization, quality of education and research, linkages with industries and making entrepreneurs as the ultimate target instead of job seekers have changed the functions of the universities as a whole.

The following section will discuss the opportunities and the challenges that face BIs based university in practicing its role in enhancing entrepreneurship. So, the author will examine first the challenges then move to opportunities to overcome these challenges.

4. Challenges and opportunities confront the role of university business incubators role in supporting the entrepreneurship

4.1 Challenges confront university business incubators role in supporting the entrepreneurial practices

There are many challenges that face UBIs, Gibb (2013) explained that there is no defined metrics to measure university performance concerning incubates. The UBI Index (2014)

confirmed that another common challenge in managing an incubator is to find leaders at universities. This can be solved by maintaining good relationships with local firms working with companies as they are good recruiters, and many companies get their CEOs through them.

Building inter-disciplinary trends, making entrepreneurial education accessible to all students, mixing students from economic and business studies with students from other faculties and with different backgrounds and generating start-up groups remain key challenges to reinforcing entrepreneurial universities as outlined by LEED Report (2018).

The lack of suitable elements of successful entrepreneurs in the society is another issue for challenges as mentioned by [Gibb \(2013\)](#), [Peters, et al. \(2004\)](#) and [McAdam and Marlow \(2007\)](#) argued in support of this study that BIs, like any type of business, face numerous challenges; these challenges of BIs in South Africa face difficulty accessing entrepreneurial management; lack entrepreneurial skills; sustainability; access to advanced technology-based facilities; and access to funding and sponsors.

Another challenge discussed by [Turker and Senem \(2009\)](#) that the educational system should create a favorable environment that enables young people to develop their mindset from employees to employers. Preparing these students to improve skills and knowledge to create jobs as this is one big goal of new entrepreneurial universities. The fact that BIs are implemented and running within universities helps to accomplish this goal.

Overall, there are several problems within UBIs that can be identified. First, the financing sources to support the incubator's activities. The current seed capital is too low, for the size and purpose of a specific venture; there are many programs to give financial means to ventures, but they are mostly accessed by special requirements that some ventures do not have. Second, despite the infrastructure's availability for the incubator's entrepreneurial purposes, it is currently not in use or has other administrative purposes because of a lack of interest in the incubation program. Finally, there is no accurate cooperation between university, government and industry, the absent of legislations and weak communications towards fostering the entrepreneurship affects its further development, therefore, the entrepreneurial environment is not qualified to flow properly. But still there are a lot of opportunities which entrepreneurs can benefit from.

4.2 Opportunities confront university business incubators role in supporting the entrepreneurial practices

4.1.1. Networking. [Lyons \(2002\)](#) divided the networks into internal and external networks, and confirmed that the most important service offered by an incubator is the chance for (internal) networking among ventures. Therefore, tenants had relationships with other incubator ones. In practice, these relationships may include formal or informal partnerships, common ventures, buy from/sell to relationships or basic information exchanges. This leads to make cooperation and create an environment where entrepreneurs exchange resources and experiences, learn from each other, exchange contacts and establish cooperative business relationships.

[McAdam and Marlow \(2007\)](#) viewed the importance of networking in the entrepreneurial initiative in providing new ideas and thinking, which then boosts the sustaining of the tenants or entrepreneurs. They discussed that networks do four key roles: providing new ideas and resources that support entrepreneurial process; facilitating the achievement of truthfulness through the formation of union with existing occupants; sharing and generating knowledge and learning; and developing to connect the various relationships, which in turn facilitate the achievement of entrepreneurial objectives and firms' growth.

Addressing market failure. McAdam and Marlow (2007) explained that BIs represent an opportunity for ventures as they provide different kinds of assistance such as administrative support, the visibility in the market and being on one's own versus being in a "community". BIs also provide a close physical proximity, such as being located on the same floor, social capital needs, some investment and "some of the primary costs are paid for in the form of time invested in social initiatives". Mian (1996) added that these services are considered value-added and this is the core of university incubators to develop the growth and sustainability of the tenant companies by creating the opportunity to use university resources.

Relation to academic institutes. Incubatees tend to want to be associated with academic university staff for they see them as experienced and reliable knowledge sources with positive reputations. According to Wachira *et al.* (2016), a partnership between incubatees and the academic staff can result in stronger credibility (40.4%) and new business opportunities (19.1%).

Human capital and staff. Ahmad and Ingel (2011) confirmed that the staff of BIs does not often have the needed management skills, as the capabilities and skills of BIs are likely related to the performance of the incubatees, from one hand, and the administrative staff, from the other hand. Mavi *et al.* (2019) stated that the ranked factors affecting UBIs management revealed the "human capital" as the most-important factor followed by technological, financial and organizational factors. Trained managers and employees are the backbone of all institutions and especially incubators. Businesses compete to acquire the highly competent people to run the business, and to achieve growth and competitive advantages.

Findings, recommendations and further agenda

Conclusion

From the previous analysis, we can draw several concluding remarks that can be used as guiding principles for policy recommendations. This research set out with the objective to shed further light on BIs as a vital policy at the economic level in developed and developing countries as well as their ability to resolve economic problems and achieve economic growth. BIs provide services to new start-up firms for they can promote and survive through their start-up's first stage.

The author emphasized that the incubators' goal should be work at the outlines of the triple helix, where universities, industries and public sectors reinforce each other by taking innovation and entrepreneurship in its account. Similarly, SMEs and multinationals often turn to the university to find solutions for their R&D needs, instead of performing the whole process themselves.

The main recent target of universities becomes to help industries and businesses in solving their problems by providing accurate solutions. This is because universities have also moved away from basic research as a public service towards organization-based profits.

This study concluded that the initiative to be far from a non-profit based organization towards a profit-generating tool has increased the competitiveness among universities, the competitive environment, revenue maximization, quality of education and research, linkages with industries and making entrepreneurs as the ultimate target instead of job seekers have changed the functions of the universities as a whole.

The results indicate that there are significant recommendations for universities to be more entrepreneurial and innovative and towards what is called entrepreneurial universities. Thus, the matter needs monitoring the impact of entrepreneurial support on the

graduates' entrepreneurial behavior. In addition, business activities of the university community members will help to reinforce motivation and creativity as students are already involved in firm activities may take part in start-ups more than individuals with pure academic experience because the latter does not have the same opportunities. In addition, it is important to provide faculties and students with an entrepreneurial mindset to understand new businesses through linking talent needs and industry demands with the university researchers' experiences, their correlation between industry, development and academic research could generate knowledge and creating new businesses as this information exchange depends on certain cultural determinants of academic entrepreneurship.

There were some attitudes and directions came from a package of different competencies such as creativity, autonomy personal control, leadership and risk management to succeed in an entrepreneurial project at a university.

The model provided by the author confirmed that the role of university incubators is not limited to providing services to start-ups rather they support leadership and reinforcing entrepreneurial culture as they did not only depend on educating students, evolving research or even transferring knowledge and spin-offs but also depend on building the tools to enhance innovation, entrepreneurial thinking, developing organizations and entrepreneurial leaders and upgrading people's living standard.

There were different variables that influenced the students' intention at universities to start a business as individual skills that were linked to safety, autonomy and technology orientation on one hand and entrepreneurship education to the other.

The results also emphasized the difference between the intention to start one's own business and to have the required skills to do it. Also, the establishment of new companies is a basic objective of supporting entrepreneurship at universities, but not its only objectives as creating entrepreneurial mindsets that create innovation in existing firms is of equal importance; so entrepreneurial universities should have their own strategies concerning training and supporting different skills to students to encourage and start their own businesses.

The author concluded that building inter-disciplinary trends, making entrepreneurship education accessible to all students, mixing students from economic and business studies with students from other faculties and with different backgrounds and generating start-up groups is important to reinforce entrepreneurial universities.

Most of the international experiences focused on the role of the media concerning paying sufficient attention to entrepreneurial activities to support entrepreneurship through UBIs besides the other four basic requirements for university incubators to support entrepreneurs, such as human, financial, organizational and technological resources.

Finally, trained managers and employees are the backbone of all institutions and especially incubators. Businesses compete to acquire the highly competent people to run the business, and to achieve growth and competitive advantage.

Recommendations

To develop recommendations and improve the performance of UBIs and entrepreneurship; the author provided some recommendations to policymakers and entrepreneurs as follows:

For policymakers and governments

Constructing relationships with the incubator stakeholders through networking and partnerships and creating more financial programs to push and motivate incubators and incubates.

Providing more value-added services to entrepreneurs and to pursue mentoring, networking and business management systems.

Public-private partnerships are a vital factor to the entrepreneurship process; therefore, access to financial resources is one of the problems whose indicators need to be identified, and increased.

The private sector is actively responding to many challenges and is engaging substantially in the online learning process, particularly in the USA while expanding more incrementally in the UK. There is a growing number of established UK university partnerships with private sector.

Private sector activity has particular repercussion in the professional and occupational areas. This provides chances for public universities to participate in recruiting from private entities into their postgraduate projects. Opportunities for established universities related to occupational colleges are also being taken up with consideration from official programs.

University incubators need to be considered by policymakers by providing financial and legislative assistance along with introducing incentives to private sector for their active participation. In a competitive international context, university incubators as a tool of knowledge generating and transfer to industry, research commercialization and national innovation tool has become a condition in an entrepreneurial community.

Preparing sustainable development visions and financial budgets should consider concerning university incubators' role to create an entrepreneurial community and economic development.

Setting up strong, credible and trustworthy university associations, development, public sector and society becomes a precondition for the economic, social as well as financial development of a country.

The overall higher education system requires expanding sustainable development and extension of incubators to promote innovation, creativity, globalization, commercialization and entrepreneurship.

For university business incubators and academia to support entrepreneurship

The author suggests establishing the entrepreneurship national institute to align all initiatives provided. An intensive entrepreneurial awareness campaign should take place in all areas. Entrepreneurial education should be adapted as a key part of the Ministry of Education teaching framework.

Integration between government, industry and academia should be strengthened and focused on a single objective: to create more entrepreneurship.

Qualified human resources and established entrepreneurs will allow the incubator to receive greater advantages and better training courses. Besides, an effective management is required to measure these factors this will lead to success in achieving its objectives. Success factors can be related to practical strategies and goal strategy.

The best incubation practices give attention to its members and stakeholders, but must also adapt to the current scope of the incubator, whereas understanding the incubation process within a wider framework, they understand and adapt to the changes that may occur in the entrepreneurship context.

Efficiency of existing incubators also requires to be widened and fixed key performance indicators (KPIs) should be put to measure, evaluate and monitor the performance of UBIs.

Identifying the most successful factors of UBIs and directing resources towards the most important factors instead of directing all resources towards all factors.

Future research agenda

The author at the end of his research recommended some further research topics related to this one such as, entrepreneurial universities performance and its KPIs, the stakeholders of UBIs. Further researches about the problematic issues of UBIs and entrepreneurship such as funding, managers and human capital could be done, regional and comparative studies about this topic will enrich it.

References

- Ahmad, A.J. and Ingel, S. (2011), "Relationships matter: case study of university campus incubators", *International Journal of Entrepreneurial Behavior and Research*, Vol. 17 No. 6, pp. 626-644.
- Ahmad, N. and Seymour, R.G. (2008), "Defining entrepreneurial activity: definitions supporting frameworks for data collection", OECD Statistics Working Papers 2008/1, OECD Publishing.
- Al-Mubarak, H. and Busler, M. (2012), "Beyond incubators: youth entrepreneurship generation", *European Journal of Business and Management*, Vol. 4 No. 14, pp. 71-74.
- Al-Mubarak, H. and Busler, M. (2013), "Business incubation as an economic development strategy: a literature review", *International Journal of Management (IJM)*, Vol. 30 No. 1, pp. 362-372.
- Al-Mubarak, H.M. and Busler, M. (2010), "Business incubators models of the USA and UK: a SWOT analysis", *World Journal of Entrepreneurship, Management and Sustainable Development*, Vol. 6 No. 4, pp. 335-354.
- Al-Mubarak, H.M. and Busler, M. (2013), "Entrepreneurship, innovation, incubator and economic development: a case study", *World Journal of Science, Technology and Sustainable Development*, Vol. 12 No. 1, pp. 1082-1087.
- Al-Mubarak, H.M., Busler, M. and Aruna, M. (2013), "Towards a new vision for sustainability of incubator best practices model in the years to come", *Journal of Economics and Sustainable Development*, Vol. 4 No. 1, pp. 114-128.
- Audretsch, D.B. (2014), "From the entrepreneurial university to the university for the entrepreneurial society", *The Journal of Technology Transfer*, Vol. 39 No. 3, pp. 313-321.
- Barba-Sánchez, V. and Atienza-Sahuquillo, C. (2018), "Entrepreneurial intention among engineering students: the role of entrepreneurship education", *European Research on Management and Business Economics (Economics)*, Vol. 24 No. 1, pp. 53-61.
- Barbero, J.L., Casillas, J.C., Ramos, A. and Guitar, S. (2012), "Revisiting incubation performance: how incubator typology affects results", *Technological Forecasting and Social Change*, Vol. 79 No. 5, pp. 888-902.
- Chandra, A., Alejandra, M. and Silva, M. (2012), "Business incubation in Chile: development, financing and financial services", *Journal of Technology Management and Innovation*, Vol. 7 No. 2, pp. 1-13.
- Etzkowitz, H. and Zhou, C. (2008), "Introduction to special issue building the entrepreneurial university: a global perspective", *Science and Public Policy*, Vol. 35 No. 9, pp. 627-635.
- Feldman, M.P. and Desrochers, P. (2003), "The evolving role of research universities in technology transfer: lessons from the history of Johns Hopkins University", *Industry and Innovation*, Vol. 10 No. 1, pp. 5-24.
- Fern, D., Arruti, A., Markuerkiaga, L. and Saenz, N. (2018), "The entrepreneurial university: a selection of good practices", *Journal of Entrepreneurship Education*, Vol. 21, pp. 1-17.
- Fernández-N, D., Arruti, A., Markuerkiaga, L. and Nerea, S. (2018), "The entrepreneurial university: a selection of good practices", *Journal of Entrepreneurship Education*, Vol. 21, pp. 1-17.
- Gibb, A. (2013), *The Entrepreneurial University: From Concept to Action*, the Entrepreneurial University Leaders Program (EULP)

-
- Global Entrepreneurship Monitor (GEM) (2019), *Global Report 2018/2019*, available at: www.gemconsortium.org/report
- Greene, P. and Butler, J. (1996), "The minority community as a natural business incubator", *Journal of Business Research*, Vol. 36, pp. 51-58.
- Grimaldi, R. and Grandi, A. (2005), "Business incubators and new venture creation: an assessment of incubating models", *Technovation*, Vol. 25 No. 2, pp. 111-121.
- Groenewald, J., Mitchell, B., Nayager, T., Zyl, J.V., Visser, K., Train, W. and Emanuel, B. (2006), *Entrepreneurship Fresh Prospective*, Cape Town: Lynn Koch.
- Hannon, P. and Chaplin, P. (2003), "Are incubators good for business? Understanding incubation practice – the challenges for policy", *Environment and Planning C: Government and Policy*, Vol. 21 No. 6, pp. 861-881.
- Hattab, H. (2013), *Global entrepreneurship monitor: GEM Egypt report 2012*, British University in Cairo (BUE) and Global Entrepreneurship Monitor (GEM).
- Hofer, R.A. and Potter, J. (2009), *Universities, Innovation and Entrepreneurship Criteria and Examples of Good Practice*, The Local Economic and Employment Development Program of The OECD (LEED).
- Hofer, R.A. and Potter, J. (2010), *University Entrepreneurship Support: Policy Issues, Good Practices and Recommendations, Committee of the Local Economic and Employment Development Program of the OECD (LEED)*.
- Hofer, R.A. and Potter, J. (2011), *Universities and Entrepreneurship Support, Policy Issues, Good Practices and Recommendations*, The Local Economic and Employment Development Program of The OECD (LEED).
- Hong, J. and Yang, H. (2014), "A study on the entrepreneurial intention determinants of university students", *Journal of Digital Convergence*, Vol. 12 No. 11, pp. 141-157.
- Kadir, M., Begam, A., Munirah, S. and Halimahton, K. (2012), "The relationship between educational support and entrepreneurial intentions in Malaysian higher learning institution", *Procedia Social and Behavioral Sciences*, Vol. 69 No. 21, pp. 64-65. P
- Kuratko, D.F. (2004), "Entrepreneurship Education in the 21st Century: From Legitimization to leadership". Muncie.
- Lalkaka, R. (2002), "Technology business incubators to help build an innovation-based economy", *Journal of Change Management*, Vol. 3 No. 2, pp. 167-176.
- Lawton Smith, H. (2007), "Universities, innovation and territorial development: a review of the evidence", *Environment and Planning C: Government and Policy*, Vol. 25 No. 1, pp. 98-114.
- Link, A. and Scott, J.T. (2006), "U.S. University research parks", *Journal of Productivity Analysis*, Vol. 25 Nos 1/2, pp. 43-55.
- Lose, T. (2016), "The role of business incubators in facilitating the entrepreneurial skills requirements of small and medium size enterprises in the cape metropolitan area, South Africa", *Master of Technology*, Faculty of Business, Cape Peninsula University of Technology.
- Lyons, T.S. (2002), "Building social Capital for sustainable enterprise development in country towns and regions: successful practices from the United States", *Conference on the Future of Australia's Country Towns*, Bendigo.
- McAdam, M. and Marlow, S. (2007), "Building futures or stealing secrets? Entrepreneurial cooperation and conflict within business incubators", *International Small Business Journal: Researching Entrepreneurship*, Vol. 25 No. 4, pp. 25-42.
- Mahmood, N., Jianfeng, C., Jamil, F., Karmad, J. and Khan, M. (2015), "Business incubators: boon of boondoggle for SMEs and economic development of Pakistan", *International Journal of u- and e-Service, Science and Technology*, Vol. 8 No. 4, pp. 147-158.
- Maritz, A., Jones, C. and Shwitzer, C. (2015), "The status of entrepreneurship education in Australian universities", *Education & Training*, Vol. 57 Nos 8/9, pp. 1020-1035.

-
- Matotola, S. (2017), "Business incubators as the tool and technique in shifting Tanzania towards a middle income country, researchjournal's ", *Journal of Entrepreneurship*, Vol. 5 No. 3.
- Mavi, R., Gheibdoust, H., Khanfar, A. and Mavi, M. (2019), *Ranking Factors Influencing Strategic Management of University Business Incubators with ANP*, Management
- Meru, A.K. and Struwig, M. (2015), "Business – incubation process and business development in Kenya: challenges and recommendations", *Journal of Entrepreneurship and Innovation in Emerging Economies*, Vol. 1 No. 1.
- Mian, S. (1996), "The university business incubator: a strategy for developing new research/technology-Based firms", *The Journal of High Technology Management Research*, Vol. 7 No. 2.
- Michelacci, C. (2003), "Low returns in R&D due to the lack of entrepreneurial skills", *The Economic Journal*, Vol. 113 No. 484, pp. 207-225.
- Moreno, A., Muñoz, L. and Morote, R. (2019), "The role of higher education in development of entrepreneurial competencies: Some insights from Castilla-La Mancha university in Spain", *Administration Sciences Journal*, Vol. 9 No. 16.
- National Business Incubation Association (2014), *The History of Business Incubation: What is Business Incubation*, National Business Incubation Association.
- OECD (2001), *Sustainable Development Critical issues*, OECD, Paris.
- Peters, L., Rice, M. and Sundararajan, M. (2004), "The role of incubators in the entrepreneurial process", *The Journal of Technology Transfer*, Vol. 29 No. 1, pp. 83-91.
- Phillips, R.G. (2002), "Technology business incubators: how effective as technology transfer mechanisms?", *Technology in Society*, Vol. 24 No. 3, pp. 299-316.
- Ravesteijn, W. and Sjoer, E. (2010), "The techno-entrepreneur of the future: perspectives and practices", *In Knowledge Collaboration and Learning for Sustainable Innovation: 14th European Roundtable on Sustainable Consumption and Production (ERSCP) conference and the 6th Environmental Management for Sustainable Universities (EMSU) conference, Delft, The Netherlands*.
- Robertson, S.L. and Kitagawa, F. (2011), *University Incubators and Knowledge Mediation Strategies: Policy and Practice in Creating Competitive City Regions*, published by the Centre for Learning and Life Chances in Knowledge Economies and Societies, available at: www.llakes.org
- Robles, N. (2017), "Development of university's business incubators in Panama", Master Thesis, Faculty of Engineering Economics and Management, Institute of Business, Riga Technical University
- Roura, J.C. (2015), "Business incubation: innovative services in an entrepreneurship ecosystem", *Service Industries Journal*, pp. 1-18.
- Ruskovaara, E. and Timo, P. (2013), "Teachers implementing entrepreneurship education: Classroom practices", *Education + Training*, Vol. 55 No. 2, pp. 204-216.
- Salem, M.I. (2014), "The role of business incubators in the economic development of Saudi Arabia", *International Business and Economics Research Journal (Iber)*, Vol. 13 No. 4, pp. 853-860.
- Sanyal, S. and Hisam, M. (2018), "The role of business incubators in creating an entrepreneurial ecosystem: a study of the sultanate of Oman", *International Journal of Contemporary Research in Humanities and Social Sciences*, Vol. 7 No. 1, pp. 60-77.
- Schmitz, A., Urbano, D., Dandolini, G.A., de Souza, J.A. and Guerrero, M. (2017), "Innovation and entrepreneurship in the academic setting: a systematic literature review", *International Entrepreneurship and Management Journal*, Vol. 13 No. 2, pp. 369-395.
- Seoane, F.J.F., Rodriguez, G.R. and Rojo, D.A. (2014), "The influence of training and gender in entrepreneurship through business incubators in Galicia (Spain)", *International Journal of Social Science and Entrepreneurship*, Vol. 1 No. 9, pp. 611-623.
- Shahzad, K., Ali, Q., Bajwa, S.U. and Zia, S.A. (2012), "Role of incubation in women entrepreneurship development in Pakistan", *Asian Journal of Business Management*, Vol. 4 No. 2, pp. 200-208.

-
- Sherwood, A.L. and Covin, J.G. (2008), "Knowledge acquisition in university–industry alliances: an empirical investigation from a learning theory perspective", *Journal of Product Innovation Management*, Vol. 25 No. 2, pp. 162-179.
- Somsuk, N., Laosirihongthong, T. and McLean, M.W. (2012), "Strategic management of university business incubators (UBIs): resource – based view theory", *International Conference on Management of Innovation and Technology (ICMIT)*, IEEE, Bali, Indonesia, pp. 611-618.
- Tamásy, C. (2007), "Rethinking technology-oriented business incubators: developing a robust policy instrument for entrepreneurship, innovation and regional development?", *Growth and Change Journal*, Vol. 38 No. 3, pp. 460-473.
- The European report of research and innovation program's (2018), Report of research and innovation program under grant agreement the European Union's Horizon 2020 Best Practice, My Gate Way (2018), Project no. 780758, the Central and East European (CEE).
- Todorovic, Z.W. and Suntornpithug, N. (2008), "The multi-dimensional nature of university incubators: capability/resource emphasis phases", *Journal of Enterprising Culture*, Vol. 16 No. 04, pp. 385-410.
- Turker, D. and Senem, S. (2009), "Which factors affect entrepreneurial intention of university students?", *Journal of European Industrial Training*, Vol. 33 No. 2, pp. 142-159.
- Volles, B.K., Gomes, G. and Parisotto, I.R.D.S. (2017), "Entrepreneurial university and transfer of knowledge and technology", *Electronic Journal of Administration*, Vol. 23, pp. 137-155.
- Vryonides, M. and Lamprianou, I. (2013), "Education and social stratification across Europe", *International Journal of Sociology and Social Policy*, Vol. 33 Nos 1/2, pp. 77-97.
- Wachira, K., Ngugi, P. and Otieno, R. (2016), "Role of social networks in university based business incubators in promoting entrepreneurship growth", *International Journal of Academic Research in Economics and Management Sciences*, Vol. 6 No. 1.
- Wagner, K.V. (2006), "Business development incubator programs: an assessment of performance in Missouri", Dissertation, Capeila University.
- Wang, W. and Wang, C. (2013), "University-industry business incubators in Taiwan", *Open Journal of Business and Management*, Vol. 1 No. 1, pp. 1-8.
- Xu, L. (2009), "Business incubation in China: effectiveness and perceived contributions to tenant enterprises", *Management Research Review*, Vol. 33 No. 1, pp. 90-99.

Further reading

- Ahmad, N. and Richard, G. (2008), "Defining entrepreneurial activity: definitions supporting frameworks for data collection", OECD Working Paper.
- Hofer, N. and Andrea, R. (2009), "Universities, Innovation and Entrepreneurship Criteria and Examples of Good Practice", OECD LEED Program.
- Wilson, K. (2008), *Entrepreneurship Education in Europe*, in Potter, J. (Ed.), Entrepreneurship and Higher Education, OECD, Paris.

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